

REMARKS

Claims 32, 34, 35 and 37 are pending. Claims 32, 34 and 37 are amended and claims 33 and 36 are canceled. A marked-up version showing the changes made by the present amendment is attached hereto as "Version with markings to show changes made."

As a preliminary matter, an Information Disclosure Statement was filed on November 15, 2002. The Examiner is requested to return an initialed copy of Form PTO-1449 showing consideration of the cited references with the next Patent Office communication.

Claim 32 was rejected under 35 U.S.C. §103(a) as being unpatentable over Uzoh et al or Alpaugh et al or Burnett et al. This rejection has been rendered moot by the present amendment which incorporates the features of claim 33 into claim 32.

Claim 33 was rejected under 35 U.S.C. §103(a) as being unpatentable over Uzoh et al. Favorable reconsideration is earnestly solicited.

Uzoh et al discloses a plating apparatus, but does not disclose a molten solder vessel as set forth in amended claim 32. In addition, a sensor is provided to detect a component in a plating solution in Uzoh et al. In the present invention, an oxygen sensor is arranged to detect an oxygen concentration outside the molten solder vessel. Accordingly, Uzoh et al fails to teach or suggest the presently claimed invention.

JP09-223696, cited in the Information Disclosure Statement filed on November 15, 2002, discloses a melting furnace 12 in which a bump is formed. The bump includes a solder bump.

U.S. Patent Application Serial No. 09/533,365

JP '696 discloses an inert gas to be introduced into the furnace, but does not disclose the use of an oxygen sensor.

Accordingly, none of the cited references discloses a flux vessel disposed in a booth in which a molten solder vessel is disposed.

Claims 34 and 35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Uzoh et al in view of Harnden et al. Favorable reconsideration of this rejection is earnestly solicited.

Uzoh et al does not describe the transport mechanism, as acknowledged by the Examiner. Harnden et al is applied by the Examiner for its disclosure of a conveyor mechanism.

Claim 34 has been amended to clarify that the coupled coupling members are provided so that the semiconductor element can float on the molten solder. See page 27, line 29 through page 28, line 8 of the specification. As such, the semiconductor element can be maintained parallel to the surface of the molten solder. The cited references fail to teach or suggest the features of amended claim 34.

Claims 36 and 37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Uzoh et al in view of Wanesky. Favorable reconsideration of this rejection is earnestly solicited.

Wanesky is applied by the Examiner for its disclosure of a mechanism of holding a chip by suction.

Claim 37 has been amended to set forth that the coupled coupling members are provided so that the semiconductor elements can float on the molten solder. The combination of references fails to teach or suggest the features of amended claim 37.

U.S. Patent Application Serial No. 09/533,365

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants' undersigned attorney.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
Petition for Extension of Time

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IN THE CLAIMS:

Claims 32, 34 and 37 have been amended as follows:

32. (Amended) An apparatus for producing semiconductor devices comprising: a booth; a flux vessel disposed in said booth; a molten-solder vessel arranged in said booth so that gold bump elements provided on the electrodes of a semiconductor element can be immersed in said vessel, means for supplying inert gas into said booth; and means for detecting the oxygen concentration in said booth.

34. (Amended) An apparatus for producing semiconductor devices comprising a molten-solder vessel arranged so that gold bump elements provided on the electrodes of a semiconductor element can be immersed in said vessel, and a support structure for hanging said semiconductor element, said support structure including a hanging mechanism comprising at least two mutually movably coupled coupling members so that the semiconductor element can float on the molten solder.

37. (Amended) An apparatus for producing semiconductor devices comprising a molten-solder vessel arranged so that gold bump elements provided on the electrodes of a semiconductor element can be immersed in said vessel, and a support structure for holding said semiconductor

element, said support structure including a holding mechanism comprising at least two mutually movably coupled coupling members so that the semiconductor element can float on the molten solder and a pump-type adsorption head having an open suction hole for holding the semiconductor element.